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(54) FAT-REMOVING FILTER
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(51)² B01D 46/10 B01D 35/14 B01D 29/04 A62C 3/04
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(74) CO

(57) Claim 1. A filter for removing fats carried by an air stream comprising,

(a) an open-backed housing formed of non-inflammable material,

(b) a series of louvres formed in a front face of the said housing and extending angularly rearwards from the said front of the housing into said housing so that when the housing is positioned in an air stream any fats depositing on the inside of the said housing drain inwards over the said louvres,

(c) a sump in a lower part of the said housing to receive fats flowing downwards in said housing, and

(d) a filter medium in the said housing extending across the said housing within the housing rearward of the said louvres and carried by the said housing, the filter being formed of an open-mesh fibrous, non-inflammable material.

Clas



COMPLETE SPECIFICATION

(ORIGINAL)

FOR OFFICE USE:

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TO BE COMPLETED BY APPLICANT

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Complete Specification for the invention entitled:

"FILTER"

The following statement is a full description of this invention, including the best method of performing it known to me.

This invention relates to a filter, and in particular, it relates to a filter of a type which is used in localities where air carries impurities such as fat, and particularly where these require to be removed from an area before the air is discharged to the atmosphere.

In kitchens, particularly kitchens in cafes, hotels and the like, it is customary to have filters above the stoves and other heating equipment which remove solids from the air being discharged through fans or the like, and one of the main ingredients which must be removed, is grease or fats from frying and similar activities, which tend to readily clog filters, and to become a fire hazard unless the filters are correctly designed.

It has been proposed heretofore, to have removable filters in localities of this nature, but generally these are expensive, and in those cases where the filters are cleanable, require considerable work to reinstate them to be again usable.

On the other hand, disposable filters may cause problems in ready disposing after use, as it may be necessary to change such filters a number of times in a week, and the cost and effectiveness of the filters therefore and ready disposal of the filter, is of considerable importance.

The object of the present invention is to provide a filter for the purpose outlined, and to achieve this in a simple and effective manner.

The filter according to this invention, consists of a housing which supports a filter material, the housing being

adapted to be fitted into a duct or the like through which the air flows or is forced, and preferably being removable either for ready exchange with a clean filter or for reprocessing to again make the filter usable.

5.

The filter is made of a material which is non-inflammable or of a nature such that it is difficult to support a flame, and the case as well as the filter material are so arranged that in the event of a fire, the device will prevent the spread of the fire through burning within a critical part of the filter.

10.

Thus the invention is said to reside in a filter for removing fats carried by an air stream comprising,

15.

(a) an open-backed housing formed of non-inflammable material,

20.

(b) a series of louvres formed in a front face of the said housing and extending angularly rearwards from the said front of the housing into said housing so that when the housing is positioned in an air stream any fats depositing on the inside of the said housing drain inwards over the said louvres,

25.

(c) a sump in a lower part of the said housing to receive fats flowing downwards in said housing, and (d) a filter medium in the said housing extending across the said housing within the housing rearward of the said louvres and carried by the said housing, the filter being formed of an open-mesh fibrous, non-inflammable material.

To enable the invention to be fully understood,
an embodiment there of will now be described with
reference to the accompanying drawings, in which:

Figure 1 is a sectional view of an exhaust
5. duct carrying a filter according to this invention,

Figure 2 is a section of the filter on line
2-2 of Figure 1, _____

Figure 3 is an enlarged section of a corner of the filter to show the construction of the housing and attachment of the filter element,

5 Figure 4 is a perspective view of a corner of the housing as seen from the back, and

Figure 5 is a similar view as seen from the front.

10 The filter housing 6 is formed of fibre board or a similar material, which is formed as a laminate in that it has a front and rear covering of aluminium or similar non-inflammable material, the laminate being prepared to have a core 7 of fibre board coated on both sides with a layer of aluminium 8, which is adhered thereto by a suitable adhesive. The relatively thin aluminium sheeting giving the laminate a sufficient strength ensuring that the case is fireproof, a condition necessary to render it suitable for the present purpose.

15 The front 9 of the housing has a series of louvres 10 to allow air to flow through the housing, and such air flow is assisted by the fan 11 which forms part of the duct 12, the duct 12 having a recess formed in it by turning back the portions 13 and then turning inwards the marginal portions 14 to form a space in which a filter can be housed. The filter is held in the space by clips 15 which engage the inturned portion 14 as shown in Figure 2 and have the portions 16 shaped to grip the outer wall of the housing 6 of the filter.

25 Within this housing 6 is a matted fibrous filter sheet 17 which preferably has a low melting point so that it

collapses at a selected temperature preferably one just lower than the combustion temperature of grease. Such a material is known under the trade mark ^(Registered Trade Mark) "Viledon" as this material is self-extinguishing, and while it can have a relatively open fibrous construction with little restriction to the passage of air, it has been found that greases and similar materials are attracted to the fibrous members, and do not pass through a sheet of such material.

Should however, the temperature rise such as when a fire occurs, the material because of its relatively low melting point, will collapse and will carry with it any grease or the like which is caught on the fibrous members, and the housing is so arranged that this grease is not discharged from the housing, but can burn in the base 18 of the housing 6.

Because of the collapsing nature of this filter material under excessive temperatures, it will be realised that before a temperature at which a fire would occur is reached, the filter material collapses, carrying with it suspended grease or the like, and instead therefore of the grease being held on the fibrous material in the zone through which the air passes, it falls into the bottom of the housing where it is partly protected against ready excess of oxygen and thus then minimizes or greatly reduces any fire hazard.

The housing 6 is so constructed that any grease or the like which flows from the fibrous material of the filter is retained within the housing even when the filter is inclined



as shown in Figure 1, this being a frequent mounting of filters, and this can be achieved by louvring the front faces of the housing in such a manner that flow is directed inwards should any grease reach the inner front wall of this filter.

The protected fibre board can also be treated with other non-inflammable materials, and the construction of the housing can be varied, but in the illustration the housing is formed by cutting a sheet of the material to form the louvres and then bending back the edge portions 18 and then bending the marginal portions 19 inward as shown particularly in Figures 4 and 5. The filter is fitted into the back of the housing so formed and is held thereto by a marginal line of adhesive 20.

By means of the above construction, the filter can be formed with a relatively open texture to give a minimum air flow obstruction, but by using a filter material which tends to attract the grease and hold it, good separation of the grease or the like from the air is effected.

The open textured filter can of course, be of relatively substantial depth to ensure that the air is turbulent within the filter material to deposit the grease or the like on the fibres of the filter, and if required, the direction of flow through the filter can be regulated by the shape of the opening or louvres in the two sides of the filter case.

When fibre board, which has been treated to be flame

resistant is used, the device has the advantage that the board can be bent to the required configuration and can be stapled together to form the housing, or preshaped sides could be used, which could fit together and be
5 stapled together, to form the enclosure for the filter material.

Adhesives could also be used either to hold the parts of the housing together.

From the foregoing it will be realised that a simple and effective replaceable filter is provided, which
10 although it is of relatively open construction, will give a good filtering action because of the use of the fibrous filter material, and also is safe so far as fire is
15 concerned, because of the low melting characteristic of the material, which allows the filter material to collapse into a specially designed space before flame temperatures exist in the filter, and therefore there is no danger of
20 such filter materials being carried in the air stream, nor is the grease or the like in a suspended condition when the temperatures rise to the point where flames would be involved.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:-

1. A filter for removing fats carried by an air stream comprising,

(a) an open-backed housing formed of non-inflammable material,

5. (b) a series of louvres formed in a front face of the said housing and extending angularly rearwards from the said front of the housing into said housing so that when the housing is positioned in an air stream any fats depositing on the inside

10. of the said housing drain inwards over the said louvres,

(c) a sump in a lower part of the said housing to receive fats flowing downwards in said housing, and

15. (d) a filter medium in the said housing extending across the said housing within the housing rearward of the said louvres and carried by the said housing, the filter being formed of an open-mesh fibrous, non-inflammable material.

2. A filter according to Claim 1 wherein the filter medium is constructed of a fibrous thermoplastic material having a melting point below that of burning fats.

3. A filter according to Claim 2 wherein the filter medium is constructed of a self-extinguishing-material.

4. A filter according to any preceding claim wherein the housing is formed of fibre-board with a facing of aluminium on each side thereof.

5. A filter according to any preceding claim wherein the housing is formed by bending the marginal portions of a rectangular sheet rearwards and then inwards to leave an open back with a marginal surround, and fixing overlapping corners together.

6. A filter according to any preceding claim wherein the front face of the housing has parallel transverse slits in it which terminate inwards from the edges of the front of the housing and at the ends of the slits further slits extending angularly to the first said slits to form louvres which can then be bent out of the plane of the said front to provide channels to allow air to flow through the said filter.

7. A filter according to Claim 5 wherein the said filter medium is marginally attached to the said inwardly bent portions of the said sheet to extend across the open back of the said housing.

8. A filter according to any preceding claim held in a recess in a duct through which air is drawn by an exhaust fan.

9. A filter according to Claim 8 characterised in that the filter is held in the said recess by clips which engage the material forming the recess and which press against the sides of the said filter.

10. A filter constructed and operating substantially as described and illustrated with reference to the drawings.

Dated this 11th day of December, 1980.

RUSSELL JOHN MILLER and
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By their Patent Attorneys,
COLLISON & CO.

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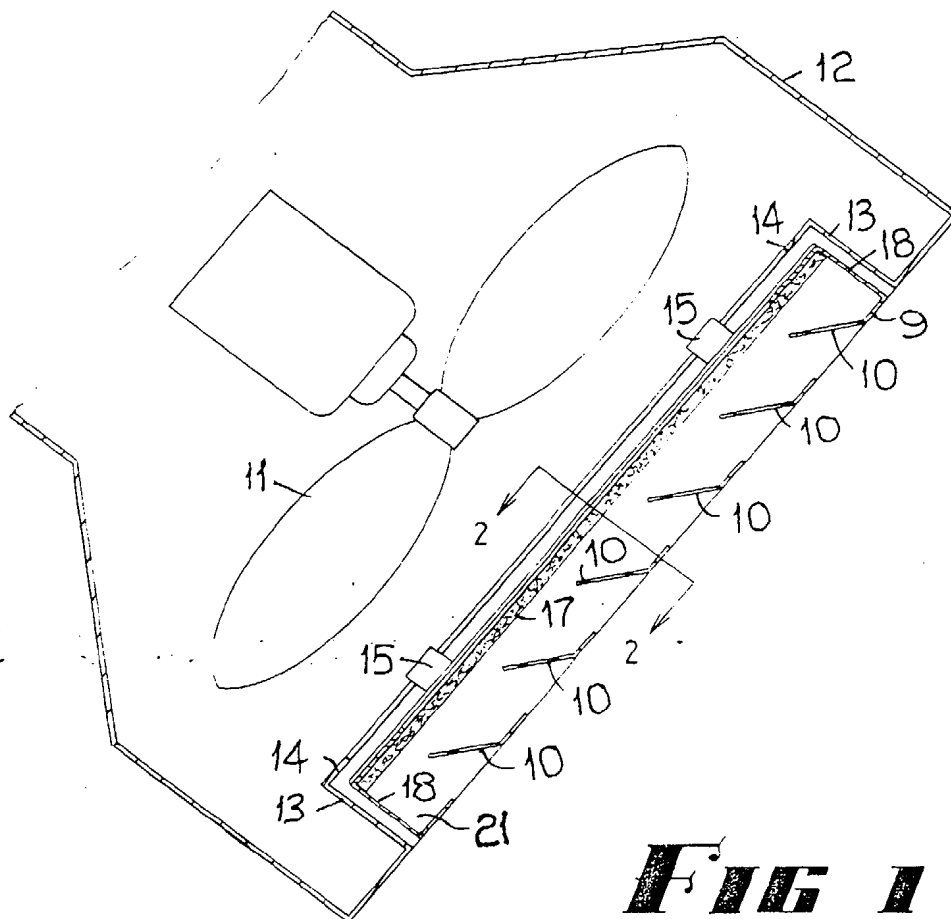


FIG 1

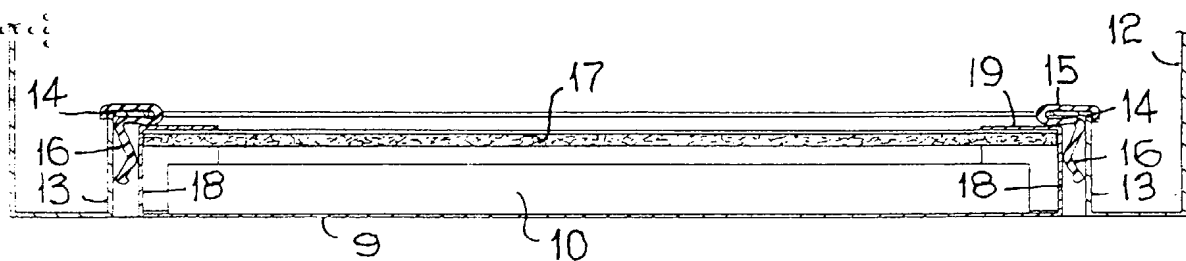


FIG 2

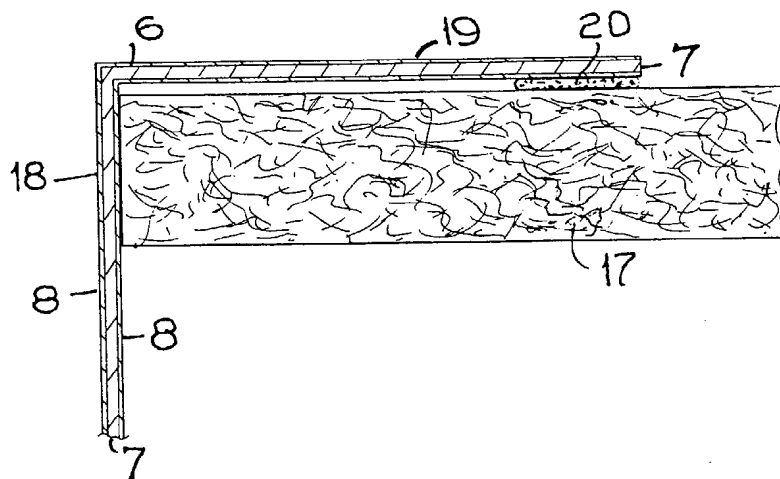


FIG 3

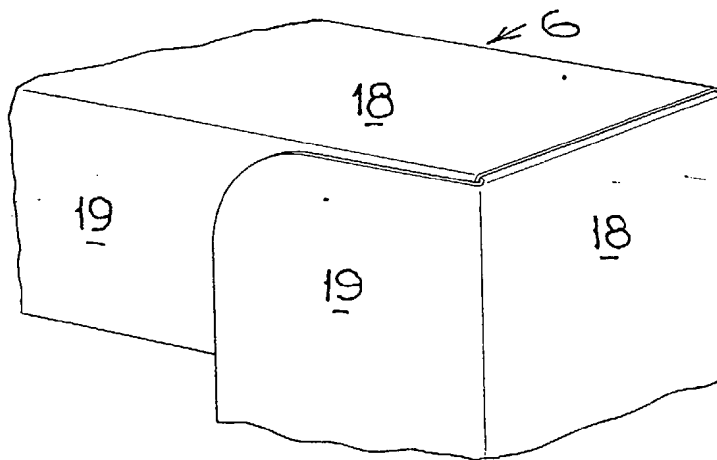


FIG 4

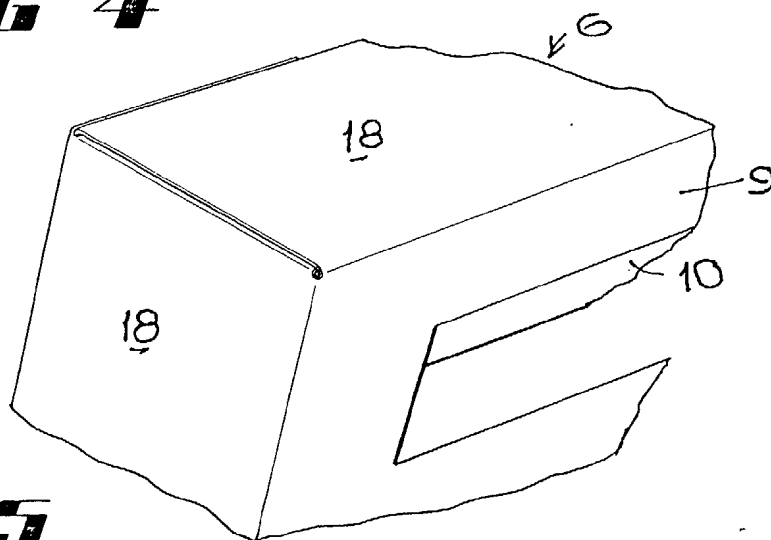


FIG 5